AVIATION
AND
AIRCRAFT JOURNAL

DECEMBER 6, 1920 VOL. IX. NO. 12

Member of the Audit Bureau of Circulations

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THE GARDNER, MOFFAT COMPANY, Inc., *Publishers*

HIGHLAND, N. Y.

HARTFORD BUILDING, UNION SQUARE, 22 EAST SEVENTEENTH STREET, NEW YORK

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ISSUED EVERY MONDAY. FORMS CLOSE TEN DAYS PREVIOUSLY. ENTERED AS SECOND-CLASS MATTER MAY 19, 1920, AT THE POST OFFICE AT HIGHLAND, N. Y., UNDER ACT OF MARCH 3, 1897.

THOMAS-MORSE AIRCRAFT CORPORATION

AVIATION AND AIRCRAFT JOURNAL

Vol. IX DECEMBER 6, 1920 No. 12

American Pilots

THE recent Pulitzer Trophy Race was further evidence that American pilots are as good as any in the world.

Foreign authorities have laid great stress on the exploits of their pilots and some people in this country have received the impression that the United States is outclassed in that respect. It is an absolute fallacy. One of the principal reasons for the lack of mention of individual pilots has been the large number of first class pilots at work in this country. The somewhat unfortunate dearth of aviation meets has allowed the daily papers to forget, to some extent, the existence of these men.

The aerial mail is an example of the public's forgetfulness of the excellence of the pilots employed. It is one thing to fly from one airport to another on a clear warm day, but it is a different proposition to take off in a fog and fly through a snowstorm or two with the temperature below zero. And that is just what the mail pilots are required to do very frequently. Flying on schedule in storms requires a much higher order of piloting than incidental flying in the neighborhood of an airport. Many of the pilots in the mail service have had over two thousand hours of flying. That figure may not seem much to the layman, but it requires steady flying for a few years to obtain it, or to put it another way, it means about 150,000 miles of travel.

The Army and the Navy have many pilots who can be classed among the best in the world and who are unknown to the general public. The race brought several of them into prominence and there are many more yet to be heard from. The Mineola-Alaska flight was as big a feat as the Cairo-to-the-Cape-flight. It was much more of a success. There were no casualties and the same machines returned without major repairs. In the other famous flights that have been made since the war there is no instance of more than one machine completing its mission. Such public meets, as the Pulitzer race allow the service pilots a chance for recognition. It is a maxim of military and naval affairs that good work is the duty of an officer and that publicity can not be permitted. This is essential to discipline and coordination of effort. But in open competition with civilians in a sporting event or performing some extremely hazardous enterprise such as crossing the Atlantic or flying to Alaska, it is due to the officer and his country that the fact be known. The public should not believe that because it doesn't know the names of the fine pilots we have, that they don't exist.

The Design of Wind Tunnel Balances

WHEN the first modern wind-tunnel was erected in this country at the Massachusetts Institute of Technology, the National Physical Laboratory type of balance was adopted. In several other tunnels the same balance was adopted without much modification.

The N. P. L. type of balance is an excellent one and has given the most valuable results. It has been very wisely copied in this country because it is difficult to modify a piece of laboratory apparatus with which a man has had no practical experience. But now that a number of men have lived and worked with these balances for a number of years, it would seem as if in future construction a little more originality could safely be shown.

It might be possible to design the recording balances whereby the number of men employed on a test will be diminished. It might be possible to regulate the speed of the wind automatically, and to correlate with the readings of the balances. Stability investigations would be greatly facilitated by an instrument allowing other than the simple longitudinal forces to be readily measured.

There is no reason why wind-tunnel balances should become unduly conservative or stagnated.

The Pulitzer Trophy

THE Pulitzer Trophy race has given a new incentive to designers and aeronautical engineers. They have seen the Army and Navy Air Services place a premium on speed and it has convinced them that any amount of money will be spent for the few excess miles per hour.

Races in other sports have been the means of bringing speed to the fore, in horses, automobiles, bicycles and yachts. That 1920 will go into aeronautical history as a year of great advance in airplane design is now assured. The development of the biplane has been noteworthy. The triplane has had its successes. The monoplane is being used in all sizes and types. From these lines of endeavor will unquestionably some results which will tend to bring to each class a more definite relationship to performance.

Prize Contests

THE plans that are now being considered for the offering of prizes for contests in the design and performance of aircraft will, if completed, make next year noteworthy in this respect. There have been from time to time suggestions of such contests but only recently have they been based on more than hopes.

In the design of airplanes there is the normal competition that is always going on for improvement, but by having a contest for the design alone of a highly specialized type without the limitations of constructional problems, it is probable that many new features will be brought out.

Contests for commercial types of planes are also being planned, with adequate prizes to make possible real attempt to produce more economical aircraft. That this kind of competition is the most urgent of all is evident.

Commercial aeronautics is now awaiting data which such a contest would produce. A great stimulus would be given to the whole art by a sensibly planned contest which would give real facts as to costs per ton mile of useful commercial load.

The Pulitzer Trophy Race

The Verville-Packard won the Pulitzer Trophy at a speed of 178 m.p.h. for the 132 mile circuit. This is the same machine that was entered in the Gordon Bennett race and its recent performance shows clearly that it is one of the fastest airplanes in the world, if not the fastest. At a speed test made after the race the machine made 186 miles per hour over a measured mile. It is expected that more speed trials will be made with this machine in the near future and that the world's speed record which is now claimed to be 192 miles per hour for a straight away measured mile will be passed by a safe margin. The machine was very skillfully handled by Capt. Corliss C. Moseley who was Maj. Schroeder's alternate in France at the last race. The Packard engine is rated at 600 horsepower

The second prize was won by Capt. Harold E. Hartney in a Thomas-Morse MB-3 pursuit plane, powered with a 300 Wright engine. Capt. Hartney attained an average speed of 168.5 m.p.h. for the course. His piloting was extremely good and as the first plane to get away he created a great sensation. Bert Acosta in an Ansaldo Balilla gained third place at an average speed of 154 m.p.h.

The Pulitzer Trophy

The race was witnessed by at least 25,000 people. Not all of this number were at Mitchel Field. The roads following the course of the race were lined with parked automobiles and large crowds watched the race at both Lufberry and Henry J Damm Field, the turning points of the course. The absence of serious accident and the high speeds displayed made a great impression on the spectators. Many who looked at aviation as a rare venture, realized its stability and progress when they saw over forty airplanes competing in one event.

The management of the race was excellent and the cooperation of Major Christie who is in command at Mitchel Field went far toward making the race a huge success. The roll of the officials follows and they one and all deserve great praise for their excellent voluntary efforts

Contest Committee

*Benjamin F. Castle, *Chairman*

*Caleb S. Bragg, *Harry Guggenheim, *David McCulloch, ‡H S Brown, ‡Richard F Hoyt, *Edward O McDonnell, *Douglas Campbell, †Alan R. Hawley, *Charles E. Merrill, *Maurice G Cleary, †Albert B Lambert, †George M Myers, *W Redmond Cross, *William A. Larned, †Howard A Scholle.

Referee

J. G Vincent

*Pilots—Army or Navy Air Service

†Balloon pilots

‡U. S. Aircraft Production

Judges

William A Larned

Col. James A. Blair, Jr, Charles B. Warren, Roger B Whitman, Philip A. Carroll, Philip J. Roosevelt, Charles Dillingham, W Redmond Cross, Col. Jefferson DeMont Thompson, William C Potter, Charles Jerome Edwards, Robert D Wrenn, Edward R. Thomas, Charles E Merrill, Alan R. Hawley

Starter

Caleb S. Bragg

Timers

Richard F. Hoyt, R. A. Leavell.

Technical Committee

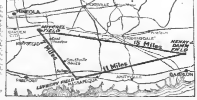
Henry Crane, *Chairman*

James Breese, Jerome C Hunsaker, G C Loening, Major V E. Clark, Alexander Klemin, Charles M. Manly, L. R. Grumman, Victor, Kluerath, George Meade, Mayo D Hersey, Charles Lawrance, Elmer A. Sperry, C. Willard, Chance Vought, Col. Jesse G. Vincent, W. L. Gilmore.

Army Officials Cooperating

Captain Arthur Christy, Commanding Mitchel Field, Capt. Henry Abbey, Jr., Charge of Personnel, Lieut. Gresham, Adjutant, Mitchel Field, Colonel Bower, Charge of Medical Research Laboratory, Captain Lamphier, in Charge of Flying Field, Major Cacenus, Post Surgeon, Captain Smith, Assistant, Charge of Flying Field, Major Strong, Flight Surgeon, Lieut. Ross Kirkpatrick

The winning machine is the same plane that participated in the Gordon Bennett race in France last summer and has various small changes made to it which have vastly improved its performance in regard to reliability The main dimensions are Span 28 ft., 2 in., length overall, 24 ft., 2 in.; height overall, 8 ft., 8 in., weight empty 2485 lb. and weight loaded 3233 lb The wing loading is 14.12 lb./sq. ft. and the power loading is 5.06 lb./hp. The plane is fitted with the Packard engine which is rated at 630 hp at 2000 r.p.m. with high compression pistons. During the race the engine was not operating at its maximum power but was turning over at 1700 r.p.m.



Course of the Pulitzer Trophy Race

This victory is very gratifying to American engineers as it is a vindication of their ability to turn out the world's best designs. The experience gained in the design and operation of this machine will doubtless tend to improve the standard pursuit machines.

The piloting of Capt. Moseley entitles him to take rank with the world's most skillful pilots. The difficulty of handling an airplane increases nearly as the square of the maximum speed. The Verville lands at a high speed and an infinitesimal mistake in control might easily result in disaster. It has been often said that a plane may be excellent but it requires an excellent pilot to prove it. The winning of the race demonstrates the excellence of both the pilot and the plane.

Side View of Winning Verville-Packard
Photograph by U S Army Air Service

The winner of second place was Capt. H. E. Hartney in a standard military pursuit machine with only half the engine power of the winner The Thomas-Morse MB-3 with a Wright 300 hp. engine has been in development for two years and the machine entered in the race was not special in any way One of the rules of the contest was that the parts of planes eligible for the race had to be standard parts and could be replaced by a similar part taken from a similar machine without affecting the control or operation of the machine.

The general specifications of the Thomas-Morse MB-3 are as follows Span 26 ft., chord 5 ft. 3 in length 19 ft.; wing loading 8 lb./sq. ft.; power loading 6 lb./hp.; engine, Wright H 300 hp.

The machine is of particularly pleasing appearance and gives an impression of great speed when in flight. This feature was enhanced by the skilful piloting of Capt. Hartney who flew an extremely straight course and made very good turns at the pylons. He seemed to turn only the exact amount required at each point and the machine obeyed every movement of the stick immediately It shows that the American Air Service has reached an extremely high level when a standard American built pursuit plane powered with a stock American engine can make such a fine showing against such a large field.

The winner of third place was Bert Acosta in the Italian Balilla fitted with a SPA 220 hp. engine. While this plane is of foreign manufacture it is owned and was operated by Americans. The official title of this machine is Ansaldo I and it was made by the manufacturers of the SVA machines. Acosta's flying was up to his usual standard and he gave a pleasing exhibition while warming up and testing his machine before crossing the starting line.

Lieut. St. Clair Street, the commander of the famous Alaskan flying expedition was in fourth place with an Orenco model D pursuit plane fitted with a Wright 300 hp. engine. This is another example of a standard Army service plane showing up very well in a competition. The Orenco is one of the standard planes adopted by the Army Air Service as a service plane and was flown without alteration.

The fifth place was won by Lieut. (j.g.) A. Laverents in a Vought VE-7 with a Wright 180 hp. engine entered by the Navy He far outclassed the other machines in the Vought class and so won the prize for that type. His turns were perfect and he was always within one hundred yards of the pylon when rounding the corners.

A Thomas-Morse MB-3

Side View of the Ballila Flown by Acosta

The winners of the class prizes were as follows

De Haviland Class

1—Lieut. John P. Roullot, U S A.
2—2nd Lieut. C. Eliason, U. S. A.
3—2nd Lieut. J. B Wright, U S A.

Vought Class

1—Lieut. (j.g) A Laverents, U S N
2—Lieut. (j.g) W. B Gwyn, U. S. N
3—2nd Lieut. L. H. Sanderson, U S M. C.

SE-5 Class

Capt. Maxwell Kirby, U S. A.

Committee Invitation Prize

1—Capt. H E. Hartney, U S A.
2—Lieut. St. Clair Street, U. S. A.

In cases where there was a monetary prize which was won by a service pilot, the money goes to the relief fund of the Army or Navy and the pilot received a trophy This is because Army and Navy officers are forbidden by law to be paid for their services in any way

The Navy entered a Loening monoplane with wings designed specially for speed and after covering almost the entire course at a speed of about 155 m p h, the pilot, Lieut B G. Bradley, U. S M. C., was forced to land about a mile from the finish to avoid freezing the engine. A water connection broke while the machine was on the third lap but Lieut Bradley kept on and was able to keep up the pace nearly long enough to finish. It is greatly to his credit that he landed before the engine froze instead of trying to cover the last mile

One somewhat amusing incident of the race was the entry at the last minute of the flying ambulance. Its pure white paint and red cross insignia caused a great deal of comment from the spectators.

In the large crowd viewing the race there were numerous prominent officers and civilians. General Pershing and Secretary Daniels were both present and the Army Air Service was further represented by Maj.-Gen. C. T Menoher, Chief of Air Service, Brig.-Gen. William Mitchell, assistant to the Chief of Air Service, who was the first to reach and congratulate Capt. Moseley. Capt. T T Craven, the chief of Naval Aviation and Air Commodore L. E O Charlton, British Air Attache, were interested witnesses of the race Another foreign representative was Anthony H. G Fokker, the famous Dutch airplane designer.

In charge of the Navy machines and pilots was Lieut.-Com. V. C. Griffin, Jr., of the Atlantic Fleet Shipplane Division, who was detailed to this duty by Admiral Henry B Wilson, commender-in-chief of the fleet, at the request of Capt. T T Craven, director of Naval Aviation.

A committee in charge of Lieut Com. N. C Chase, inspected the Navy planes two days prior and on the day of the race to see that they were up to specifications and in the best of condition.

The Bureau of Engineering was represented by Lieut. Com. S M Kraus and Ensign W Miller; Bureau of Construction & Repair by Com. J. C. Hunsaker and Lieut. Com. G. Fulton; the Bureau of Navigation by Lieut. Com. R. M. Griffin and Lieut. W. L. Richardson, photographer. Com. G. C. Westervelt and Com. H. C. Richardson, both of the Construction Corps came from the Naval Aircraft Factory

Col Thurman H. Bane represented McCook Field while Col. Wm E Gillmore and many officers on duty in Washington witnessed the race. Among the airplane designers present were noted, Alfred V. Verville, William B. Stout, Glenn H. Curtiss, Grover C. Loening, Walter Phipps, Chance Vought, B D. Thomas, Glenn L. Martin. In fact practically all the prominent aeronautical talent of the country was attending the contest.

Col. Jesse G. Vincent, Charles Lawrance and George Mead were looking after the engine features of the race. Men prominent in the industry in all its branches were interested spectators while New York sportsmen were to be seen in all parts of the field.

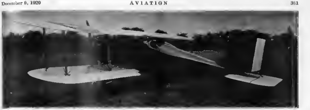
As the contest was

Captain C. C. Moseley

Capt. C C. Moseley, the winner of the Pulitzer Trophy Race, is from Los Angeles, Cal., and attended the University of Southern California where he played halfback on the football team

He entered the Army in 1917 in the Aviation Section and was trained at the Berkley School of Military Aeronautics. He went to France in the fall of 1917 and was one of the picked cadets to train overseas. After completing his preliminary training at Tours he completed his advance training at Issoudon. At Cazoux he was trained in aerial gunnery, after which he was assigned to the 27th Aero Squadron, 1st Pursuit Group and officially credited with destroying in combat one Boche two-seater He later acted as chief test pilot at the 1st air depot and returned to the United States in August, 1919

He went to France as alternate for Major Schroeder in the Gordon Bennett Race, and at present is stationed at the Office of the Chief of the Air Service in Washington.



An Grenco Pursuit Machine

regarded as a speed contest the length of the course has not been accurately determined and a survey is to be made to get the exact distance. If it should turn out that the course is more than 132 miles in length, the speeds of the contestants will be proportionately increased. As it is, the speed of the winner is probably a record for a closed circuit The winner of the Gordon Bennett race in France made an average speed of 169 m p h., nearly ten miles an hour less than that made by Capt. Moseley

Several other machines created a great deal of interest by their performance. They were the two Curtiss triplanes, the Messenger biplane and the Morane-Saulnier type AR monoplane The whistling noise made by the triplanes caused many of the crowd to refer to them as "Whistling Billies." These planes experienced engine trouble or they would have probably been up among the winners. The Morane-Saulnier gave an exhibition of its flying qualities after the race that attracted a considerable crowd and added a great deal to keeping up the interest after the finish of the race. All the machines on the field were on exhibition. The L.W.F. Owl giant was rolled out of her hangar and afforded the spectators an example of what the United States can do in building large machines. The Messenger which was designed also by Verville was flown by General Mitchell. Its tiny size was emphasized when near the Owl

The special train of the Long Island Railroad was packed and helped in no small degree in making the event a success. It is New York's misfortune that it has no airport that is more easily accessible. Had there been one for the race, there would have been no need of special trains and many more people might have come from the city, especially if the airport were located near some repid transit system.

The Finishing Order and Time

Position No.	Pilot	Airplane	Engine	Elapsed Time. M. S.
1	Capt. C. C. Moseley, U. S. A.	Verville	Packard 600	44 29 57
2	Capt. H E Hartney, U S. A.	Thomas-Morse	Wright 300	47 00 03
3	Albert Acosta	Ansaldo I	S P A. 226	51 :57 62
4	Lieut. St. Clair Street, U. S A.	Grenco	Wright 300	52 :17 02
5	Lieut. A. Laverents, U S N.	Vought	Wright 180	55 39 19
6	Lieut. J. P. Roullot, U S. A.	De Haviland	Liberty 400	56 06.58
7	2d Lieut. C Eliason, U. S. A.	De Haviland	Liberty 400	56 09.39
8	Lieut. J B Wright, U. S A.	De Haviland	Liberty 400	56 52.20
9	Lieut. C Cummings, U. S. A.	De Haviland	Liberty 400	57 08 12
10	Lieut. D L. Conley, U S N	De Haviland	Liberty 400	57 40 76
11	Capt. Horace N Heisen, U. S A.	De Haviland	Liberty 400	58 15 28
12	Lieut. D C. Finch, U. S N.	De Haviland	Liberty 400	58 32.94
13	Willis P Taylor, U S A.	SVA	S P A. 200	59 35 59
14	Capt. Maxwell Kirby, U S. A.	SE-5	Wright 180	59 42.67
15	Lieut. W. B. Gwyn, U S. N.	Vought	Wright 180	59 51 63
16	Lieut. L. Claude, U S A.	De Haviland	Liberty 400	59 56 73
17	Lieut. L. H Sanderson, U. S M. C.	Vought	Wright 180	60 09.38
18	Lieut. W R Lawson, U. S. A.	De Haviland	Liberty 400	60 :48.46
19	Capt. H B Mims, U S M. C.	De Haviland	Liberty 400	60 49.34
20	Lieut. Lucas Bean, U. S. A.	De Haviland	Liberty 400	61 01.62
21	Lieut. W. B Brown, U. S. A.	Vought	Wright 180	61 25 28
22	Lieut. T. Moffat, U. S A.	De Haviland	Liberty 400	61 47 45
23	Sergt. J K. Dunn, U S M. C.	Vought	Wright 300	61 :50.38
24	Capt. N Carolin, U. S. A.	De Haviland	Liberty 400	62 39.22
25	Charles Colt	Morane Saulnier	Le Rhone 110	73 16.33

Notes on the Pulitzer Air Race

By Alexander Klemin

Consulting Aeronautical Engineer

One can hardly imagine a better method of arousing general public interest in aviation, of educating this same general public, of stimulating constructors and designers to greater efforts than an air race of this character. An inspection of so many varied and brilliant types at one time is also a valuable object lesson to the designers. The process of tuning up the plane and the engine to their very highest pitch, and the effort to secure even an hour's reliability at maximum speed is also a very valuable practical experience, particularly as regards reliability of the power plant.

From a strictly technical and analytical viewpoint, a race of this character is far less valuable however than the careful performance testing of isolated planes. In a regulation performance test such factors as the skill of the pilot in making numerous turns and in keeping to the correct route, and the effect of wind and weather are largely eliminated. The most careful record is also made of the exact condition of plane and engine and in particular of the gross load carried. In the hurry and excitement of preparation for a race such factors are naturally lost sight of, rendering technical conclusions much more difficult if not impossible.

Reliability in the Race

Of the entries forty-two were ready to start, thirty seven started, thirty-three on schedule time, twenty-five finished. Considering the abnormality of racing conditions, this is an excellent showing. Of the twelve contestants who did not complete the race. One was disqualified for an infraction of the regulations, while eleven experienced mechanical troubles in the power plant, such as broken water connections, etc. This emphasizes once again the structural reliability of the modern airplane, and also the necessity of greater reliability in the power plant.

Improvement in Speed from Standard to Racing Machine

For those looking forward to participation in further races of this character, perhaps one of the most interesting things to know is how much faster speed can be got out of a machine when stripped for a race, than when carrying its regulation load and equipment.

Although this will vary largely for each ship depending on the useful load which is carried in the standard machine, on the amount of resistance creating equipment and on the ability of the motor to be driven at speed for an hour in a race, instead of the few minutes on a performance test, the following comparative table of the first six machines may be useful for approximate reference. In this table loss of time in making turns and so forth must of necessity be neglected, and the distance of 132 miles taken as a basis.

It can be seen at once from the accompanying table that

PLANE	ENGINE	RATED HORSE POWER	NORMAL GROSS WEIGHT	NORMAL WEIGHT PER SQ. FT.	NORMAL WEIGHT PER HORSEPOWER	WEIGHT EMPTY	MAXIMUM ESTIMATED SPEED OF NORMAL MACHINE	SPEED ATTAINED IN RACE
Verville-Packard	Packard	630 hp at 2000 r p m.	3233	14.12	5 06	2485	——	178
Thomas-Morse Single Seater Scout	Wright	320 hp. at 1800 r.p.m.	2095	8.3	6.2	1505	152	169
Ansaldo I Scout	S. P. A	220 hp.	1965	8.7	8.9	1470	137	154
Orenco Single Seater Scout	Wright	320 hp. at 1800 r.p.m.	2442	9.3	7.2	1776	147	152
Vought VE-7	Wright	180 hp at 1800 r.p.m.	2095	7.35	11.6	1560	114	143
First De Haviland	Liberty	400 hp at 1600 r.p.m.	3600	8 2	9 0	2390	124.7	146

while for the high speed machines such as the Thomas-Morse and Ansaldo roughly seventeen miles an hour have been added above the normal speeds. In the case of the Vought nearly thirty miles have been added, and in the case of the De Haviland at least fifteen miles per hour.

In none of these machines so far as is known have the wings been cut down in area. These results have evidently been obtained by decreasing the loads carried and removing all resistance forming objects such as guns, sights, gun-mounts air-speed indicators and so forth.

It would appear that in the case of very fast machines where the last possible refinement has already been introduced, much additional refinements is out of the question, but in the case of comparatively slow machines there is much greater scope for speed increase.

Prior to the race, it was the secret of each contestant what special methods he adopted. It would be interesting to know, now that the spirit of contest is over, what exactly was done in all cases. Some are fairly obvious.

Cutting down the wing area is the simplest yet most effective device. There seems to be scarcely any limit in this direction, with the ever growing skill of the pilot in landing at high speed, and the fact that in a race climb is of little consequence. A high pitch propeller may readily be substituted for the average all round stick, in which consideration has to be given to climb and ceiling as well as speed. The setting of the wings may generally be decreased, particularly if they are set at an angle of 3 to 5 degrees on the standard plane. With a fixed stabilizer, in which stability has been secured by using a large dihedral between the wings and the tail surface, this dihedral may be diminished with perceptible results.

All useful load except the pilot and fuel sufficient for the race can be dispensed with. All gadgets offering resistance can be removed. A celluloid covering over control surface gaps may be helpful. The maximum possible compression of the engine, a carburetor setting suitable for ground level at full throttle, with an increase in radiator area are simple and obvious expedients for the power plant. For each machine some special innovation is always to be found.

The Verville-Packard

The Verville-Packard as the winning plane naturally excited great interest. It has a span of 28 ft., 2 in.; overall length of 24 ft, 2 in ; weight empty, 2485 lb ; weight fully loaded 3233 lb ; wing area 228 sq. ft., loading per sq ft. 14.12 lb. With the engine rated at 630 hp. at 2000 r.p.m., the loading per horsepower becomes 5.06 lb. Allowing for the fact that the machine was more lightly loaded in the race than in actual service, it is surprising to see how readily the pilot handled the machine on get-away and landing, with a speed and not a high lift wing. If such enormous wing loading can be readily handled, designers of single-seater scouts may utilize more boldly the cutting down of wing area to secure greater speed. The Verville-Packard did not secure the world's record, experiencing carburetor trouble, nevertheless—even allowing for the very low loading per horsepower—it showed highly creditable aerodynamic efficiency. A more accurate speed test of this plane, with carburetor defects removed, will be awaited with great interest.

The apparently successful use of this enormous horsepower for a single seater scout is highly interesting. It is not certain, however, that constructors, engineers and military pilots will be converted immediately to the use of very high powered

engines for single-seaters. A practical limit for single-seater scouts has been previously considered to be 300 hp and the margin of speed between the Verville-Packard (granted even that the race value can be improved) and the Thomas-Morse is not so great as to outweigh considerations of maneuverability in a light machine, economy in construction and operation, and greater ease of handling with a smaller powered engine.

The Verville-Packard is very pleasing to the eye. It seems hardly creditable that this enormous engine could be so completely covered. The aluminum cowling is blended most

THE TWO MEN RESPONSIBLE FOR THE DESIGN OF THE VERVILLE-PACKARD PLANE AND ENGINE. COL. JESSE G VINCENT AND ALFRED V VERVILLE.

Colonel Vincent is well-known in the aeronautical world. He is one of the designers of the Liberty engine and during the war rendered valuable assistance to the Air Service in connection with the power plant program. He is Chief Engineer of the Packard Motor Car Co. and in charge of their airplane engine work. He is president of the Society of Automotive Engineers.

Alfred V Verville, the designer of the winning airplane of the Pulitzer Trophy Race, was born at Atlantic, Mich. and was first actively associated in the airplane industry in 1914 with the Engineering Department of the Curtiss Aeroplane Co. at Hammondsport, N. Y. He was later with the Aeromarine and the Thomas companies. He started the General Airplane Company in Detroit and designed the Verville flying boat, the Verville Army Land Pusher and the Verville Seaplane. In September 1917 he became chief design engineer of the Airplane Division of the Fisher Body Co., and from there went to McCook Field and designed the first USD-9 at McCook Field.

In 1918 he was sent abroad by the Director of the Bureau of Aircraft Production in charge of a special mission to study the Allied pursuit plane program and design. Upon his return to McCook Field he designed the Verville Chasse plane to use the 300 Hispano engine. This plane was flown in 1919 and in its present re-designed form is the VCP 1 which now is powered by the Packard 12 cylinder 600 horsepower motor. Mr Verville was also in charge of the design of the USD-4 Ambulance Plane which can carry two patients and the Messenger plane which has been built by the Sperry Co. At present Mr. Verville is at McCook Field as civilian aeronautical engineer.

Photo U. S. Army Air Service

gracefully into the veneer fuselage. The use of veneer allows the fin to be built integral with the fuselage, and everywhere, as at junction of wings with fuselage, and stabilizer with fuselage fairing is freely employed, while the lines of the fuselage fair well behind the disturbing aerodynamical presence of the cock-pit.

The single biplane I-strut has again been used successfully for a large, fast and heavily loaded machine. The arrangement of the lift wires, as shown in the photograph, by means of which the lift wires are made to serve as drag and anti drag wires, probably helps to strengthen the truss considerably. The N type form and aft strut bracing at the body is simple and effective.

The Thomas-Morse Single Seater Scout

The MB-3 scout shows that great care has been taken in its design to eliminate structural resistance. Fittings are placed inside the wings and fuselage wherever possible. Streamline wires are used in all exposed positions. The wing bracing is somewhat out of the ordinary. Lift wires are brought from the outer struts to the fuselage instead of to the inner struts, thus allowing the use of a smaller inner strut. The shape of the fuselage is improved at the nose by using a wing radiator. The design is light as well as clean and enables a service ceiling of over 23,000 ft. to be reached.

Gap to chord and aspect ratios are both small, apparently without serious loss of aerodynamic efficiency. The span is 26 ft and length overall 19 ft giving with these small dimensions the much desired ease of handling. A chord of 5 ft. 3 in. on both wings and a gap of 4 ft. 7 in. with no stagger are used.

The emphasis which has been placed on the performance of this entry as a stock pursuit plane now being manufactured in quantities for the Air Service is justified by its success.

The Ansaldo I

This single-seater, one of the few entered by a private firm, is a single strutter of very clean design. The wing span is only 25 ft., one of the smallest in the race. A six cylinder vertical S.P.A. motor completely cowled and cooled by a nose radiator occupies the front end of the fuselage and gives the latter a deep narrow section with flat sides. Aft of the cockpit the lines fair into a triangular section with the apex at the bottom.

This is the characteristic Ansaldo shape and gives the impression of a very sharp plan form when viewed from below. The fuselage is covered with veneer and wires are eliminated by the use of plywood bulkheads.

Wing bracing is of the conventional single-strutter type with double cables and fairing between them. The interplane struts are of steel, tapered, and the aileron controls are of the rigid type so that there is little structural resistance offered by the wings.

The Orenco D

The Orenco, type D was a highly creditable entry, and finished the race with an average speed of 152 miles per hour. It was in no sense a stripped or lightened ship, and contained its full equipment except the guns.

Its main characteristics are: Span, top wing 30 ft., span lower wing 28 ft.; chord 5 ft., wing section, R.A.F. 15; incidence 1¾ deg., gap 4 ft., 4 in.; total wing area 261 sq. ft., overall length 21 ft. 6 in.; stabilizer area 15 sq. ft., elevator area, 17 sq. ft.; rudder area, 7.88 sq. ft.; fin area, 4.36 sq. ft., engine, 300 hp Wright, weight empty, 1776 lb.; weight loaded 2442 lb., weight/sq. ft., 9.3 lb., weight/hp 8.1 lb./sq. ft.

The Orenco Type D is conventional in construction, but is very neat and well finished. The elevator is in one piece and the rudder is clear above the horizontal tail surfaces. In its standard form it has a maximum speed of 147 m.p.h. and a climb of 10,000 ft. in 8.9 minutes.

A DeH-4B, Several of Which Were in the Race

The Vought and De Haviland

The Vought VE-7 and the DeH-4 are so well known as to call for no special comment. The VE-7 is a particularly clean training machine with a Wright model E engine rated at 180 hp The surprising speed of 143 m.p h. attained in the race shows very good design for a two-seater. Streamline wires are used to good effect. The wing loading of this machine with normal full load is 7 35 lb. per sq ft., probably the lowest in the race, while the normal power loading of 11 6 lb per hp. is probably the highest. Biplane wings each 34 ft. span and 4.62 ft. chord with 4.67 ft. gap have the conventional raked wing tips.

The DeHaviland is more heavily loaded and powered than the Vought and has a normal speed 11 m p h. greater than the VE-7, yet inherent features of the design which could not be changed for the race limited the improvement in its performance so that it was defeated by an appreciable margin in the race Greater handiness was undoubtedly a factor in favor of the Vought in making the numerous turns required in the race.

Comparison with the Gordon Bennett Winner

In conclusion it is interesting to compare the results of the Verville-Packard with the wining machine of the Gordon Bennett. Lecointe's Nieuport weighs fully loaded 2060 lb or 15 6 lb. per sq ft With a 340 hp. engine the power loading is 9.35 lb. per hp. The Verville figures are 14 12 lb per sq ft. and 5 06 per hp based on 630 hp at 2000 r p m. It is unfortunate that the carburetion was such during the race that the Packard fell two or three hundred revolutions short of 2000 and it is therefore manifestly unfair to compare the power loading of 5.06 based on 630 hp for the Packard with 6 35 lb. hp. for the Nieuport. Nevertheless, the American machine has shown 178 miles per hour in this race as compared with the 168 miles per hour of the Nieuport in the Gordon Bennett.

Trials for the Speed Record

Captain Corliss C Moseley, in the United States army's Verville-Packard biplane, brought the American speed record up to 186 miles an hour in a series of test flights at Mitchel Field, Mineola, L. I., Saturday, Nov 27, but failed to establish a new world's record. In order to bring the coveted record to this country the pursuit plane will have to add another ten miles an hour to this speed.

Although the plane failed to realize the expectations of army officials, the flights brought to light an interesting problem, which, when solved, may bring to this country premier speed honors of the world.

During each of the six tests made it was observed that upon the ground the powerful 600-horsepower engine was turning over at a rate of 1,950 revolutions a minute. The moment the airplane took the air, however, the motor speed rapidly fell, until it was 200 revolutions a minute lower than the ground speed. Careful adjustment of the carburetor to overcome this condition at the end of each test failed to produce any different results.

Speed Creates Vacuum

Col. J G Vincent, designer of the engine, who was watching the experiments, after careful examination expressed the opinion that the terrific speed resulted in a vacuum being caused at the back of the carburetor, which prevented that instrument from producing the proper gas mixture to insure the full power of the engine

While the general design of the remarkable airplane is very clean, the tests also showed that further streamlining can be accomplished, particularly about the engine cowling and the windshield before the pilot's cockpit.

Immediately after the conclusion of the tests, it was announced that the plane would be shipped to McCook Field, Dayton, Ohio There the carburetor will be placed in the experimental wind tunnel and subjected to the approximate air conditions for a high speed flight. Careful observations will be made during this test in an effort to solve the mystery surrounding its performance in the recent flights.

When this has been done the plane will be sent over a measured course again for the purpose of winning for America the speed record of the world. Technical officers of the army air service feel that if the carburetor trouble is overcome this machine will make 200 miles an hour

Thomas-Morse Shows Speed

Although the army air service failed in its major expectation, the service achieved signal satisfaction in the wonderful performance of a stock Thomas-Morse scout equipped with a 300 horsepower Wright engine This is the identical machine that won second place in the Thanksgiving Day race. Capt. Harold E Hartney, the famous American ace, was the pilot on both occasions. In tests he succeeded in pressing this machine which was designed for a speed of 150 miles an hour, up to 171.25 miles an hour over the measured course

Captain Hartney covered the one-kilometer course in the Thomas-Morse 300-horsepower plane in 13 02 seconds. His average flying time over the 132-mile course on Thanksgiving Day was 168½ miles an hour, while his average for six test flights was 170¼ miles an hour This, it is expected, will prove a new world record for the type of plane.

At the conclusion of his flight the same machine was taken up by Capt. St. Clair Street, of Alaska flight fame. While at a low altitude the machine went into a nose dive. With admirable control Capt. Street brought the machine out just as it was about to crash.

Fokker Commercial Airplanes

The success of the Fokker cantilever fighting monoplane led to the design of a machine of similar type for commercial purposes. In order to keep the running costs of this essentially commercial machine as low as is at present possible, the engine power was kept down to a maximum of 260 hp Excellent results are obtained with the very reliable 185 hp B M W engine, using only 9 to 10 gallons of gasoline per hour

The maximum seating capacity, including pilot, was fixed at 7, in order to retain that speed which is the greatest asset of commercial air transport. A load consisting of five passengers, baggage, pilot and fuel for a five hour flight is very suitable for commercial purposes at the present time, with this the machine has a radius of action of 450 to 550 miles, at a speed of 90 to 110 miles per hour, according to engine used Long distance services are usually split up into stages falling within this radius, but the machine easily carries more fuel, for ten hours if required.

The engine is at the front end of the fuselage and drives a propeller of 9 ft. 10 in diameter Cooling is obtained through a nose radiator of pleasing shape which fits in with the aluminum cowling Radiating surface can be regulated to suit weather conditions by the pilot by means of shutters.

The greatest possible safety against fire is provided by enclosing the engine compartment completely with aluminum sheet and by the steel tube construction of the engine mounting and housing The letter are so designed that the engine is completely and easily accessible on all sides on removing as much of the detachable cowling as is necessary By this means the labor cost and loss of time in making small adjustments or removing and regulating the whole engine are reduced to a minimum in this machine. A further feature of the Fokker commercial monoplane is that the engine mounting is easily adapted to take practically any make of vertical 9 cylinder engine, up to 260 hp

Directly next to and slightly further back than the engine is the cockpit for the pilot, whose view, forward and down, in this position, is the most perfect imaginable and excellent for orientation and landing Fittings and instruments are reduced to the minimum desirable and are most accessibly arranged.

Elevator and rudder control are operated as usual by hand and foot levers, and the ailerons by wheel

To obtain the greatest safety against leakage, etc., pressure tanks have been avoided The gasoline tank, which feeds the carburetors by gravity only, through one pipe, is placed high up, where it cannot be damaged in a bad landing It is well protected from fire and so well separated from the cabin that passengers may be allowed to smoke.

To avoid the usual spilling about of gasoline while filling up the tanks, this operation is done in the Fokker machine direct from the ground supply by means of a pump which is a fixture in the machine Gasoline level in the tank is shown by a special type of gage in the pilot's cockpit.

Side View of the Fokker F-II

The fuselage is constructed on the usual Fokker system, of steel tube, which proved so successful in the thousands of machines used in the war. It is remarkably strong, very durable and easily repaired in case of damage. The fuselage is built right up to the bottom surface of the wing behind the pilot's cockpit and contains a cabin, which is big enough to hold six people and a compartment for baggage, directly under the wing Entrance is effected through a door in the left hand side of the fuselage.

Engine Mounting of the Fokker F-II

The seating arrangements consist of one comfortable seat, facing forwards, for two or three people and two adjustable easy chairs. In case the machine is to be used for carrying mail or freight only, all the seats can be removed, leaving a clear capacity of 170 cu. ft.

Six big windows, several of which can be let down, provide light and ventilation without an annoying draft. The heating of the cabin, which can be regulated by the passengers, makes

The ailerons are balanced like the rudder and elevators. The control cables are carried through the wings and the pulleys are accessible through inspection doors

The fixing of the whole plane, directly on the top of the body, is carried out by four bolts of which the dimensions give a safety factor of 20 This simple attachment gives the greatest certainty that the connection of wings and body is always in order and of course permits the quickest erection imaginable

FRONT VIEW OF THE FOKKER F-II

it totally unnecessary to wear special clothing even in the coldest weather, and the absence of noise allows ordinary conversation to be carried on

There is another small window forwards, which gives communication with the pilot, and an emergency exit through the roof of the cabin.

The absence of a lower wing and bracing structure of any kind provides an entirely unobstructed field of view sideways and downward, a feature which, coupled with its marvelous slow glide, makes this machine of extraordinary value for purposes where accurate observation is required, such as photography, surveying, forest patrol, bombing, parachute dropping, etc It is interesting to note in this connection that the Dutch Government Research Department uses a Fokker F-II machine as a flying laboratory, instruments, models, etc., being mounted some distance under the wing and readings taken in comfort inside the cabin

Behind the cabin, the body tapers to a vertical knife edge, to which the balanced rudder is hinged. The tail plane is fixed to the top of the fuselage and obtains its strength from a transverse cantilever beam in front and a diagonal steel strut at the rear, which connects with the bottom of the fuselage. The elevators, divided and balaced, are hinged to the tail-plane The control surfaces can all be changed in a few minutes. The tail-skid is very strongly made, of ash, and strung by steel spiral springs inside the body

The chassis is very strong and consists of eight struts, two cross struts and two cables. The axle is of large dimensions and rubber sprung To prevent sinking in soft ground, or a bad landing through a burst tire, the wheels are double and consist of two normal rims spoked to one hub

The plane is, as mentioned above, entirely built on the cantilever principle, has a span of 52 ft. 9 in., a chord of 10 ft 4 in. at the body, and 6 ft 10 in at the tips, and is 25 in. thick at the center It is built with two immensely strong box spars, on which solid three-ply ribs are fixed with corner pieces. The covering of the whole wing is also of three-ply wood, which stiffens the wing completely and dispenses with the usual fabric covering which is easily damaged and deteriorates quickly

The calculated factor of safety on the spars is 7, but load tests have proved that, with the covering, ribs, etc , this factor is raised considerably, so that there is actually a breaking load factor between 9 and 10

The great thickness of the wing, its cubic capacity and the fact that the ribs divide it up into a great number of absolutely watertight compartments, enable the whole machine to float practically indefinitely in the event of a forced landing in the water In this case the passengers get on top of the machine through the emergency exit which is provided in the roof.

The number of valuable working hours required to dismantle, often owing to a trivial breakage of one of the many small parts, re-erect and continually true up the wings of the ordinary wire braced type of airplane, and the way in which it is subject to easily unobserved, but dangerous, strains in many parts of its structure, need only be borne in mind to realise that the Fokker monoplane, cheap in first cost and in operation, and requiring a very much smaller staff to keep it in safe daily use, is claimed the be the first airplane to make air transport as a paying proposition possible.

Contrary to many types of airplanes adapted for commercial purposes, the flying qualities of the Fokker monoplane have in no way been sacrificed to commercial requirements. It flies as well and easily as any ordinary military purpose machine It is very steady in the air, longitudinal stability is entirely automatic, but it can be manoeuvered in all directions without effort. The lightness of control is a special feature, which prevents tiring out the pilot on long distance trips or in bad weather. There is no tendency to spin, and the machine tends to always regain normal position, both gliding and flying It is also easy to steer on the ground.

The results obtained with the machine of the Fokker F-II type on the London-Amsterdam Air Mail Line have been so satisfactory that next season the entire air mail service London, Brussels, Amsterdam. Hamburg, Copenhagen and Berlin will be carried out with a fleet of 1921 type Fokker F-III monoplanes, in which a few improvements on the 1920 type have been embodied. The great success of these machines has led to a special type constructed for colonial use, with an eye to climatic, landing ground, and other conditions.

The F-IV type is a larger machine on the same lines, fitted with an engine of 400 to 500 hp and carrying twelve passengers and baggage at a speed of 115 miles per hour

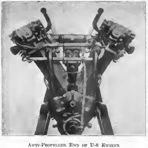
Dimensions, Weights and Performance of the Fokker Commercial Monoplane

Engine	185 hp B M W
Span overall	56 ft 8 in
Length overall	37 ft 10 in
Height	12 ft
Wing area	452 sq ft
Weight empty	2645 lb
Weight fully loaded	4125 lb
Climb	13 000 ft in 45 min
Speed	93 m p h
Radius of action	5 hrs. 475 miles (more if required)
Fuel consumption per hour	9 to 10 gal gasoline or benzole
Oil	1 gal
Paying load	1,000 lb or more (according to distance and operating conditions)

When fitted with Siddeley, Fiat, Liberty Six I. F. Benz, Maybach or similar engines, a corresponding increase in performance, without reduction of safety, is obtained.

Aeromarine U-8 180 Hp. Engine

Reliability must be the principal requirement of an aero engine, but it is not the sole criterion of aeronautical service. The question of fuel and oil consumption, which possessed comparatively little importance in time of war as long as reliability and light weight were attained, has a very important bearing on the economics of aerial transportation. Fuel and



ANTI-PROPELLER END OF U-8 ENGINE

oil economy are very pressing problems today, when the price of gasoline and of lubricants continues to soar skyward and the geologists warn us that the world's oil supply is likely to be exhausted within two or three generations.

There is still another aspect to this question Every pound of weight deducted from the fuel supply adds so much to the useful load carrying capacity of an aircraft. Since passengers and mail constitute a paying load, whereas fuel is "expense load," the all important question of fuel economy will be fully realized.

It was with these requirements in view that the Aeromarine Plane and Motor Co , of Keyport, N J , started last year the design of a new aero engine which would embody operating reliability, low fuel and oil consumption, great sturdiness and general accessibility. This engine is of the water-cooled eight cylinder Vee type, with the cylinders arranged in two rows of four around a common crankcase at an included angle of 60 deg The cylinders are 4¼ in by 6½ in. The engine is rated 180 hp at 1750 r p.m and the normal brake horsepower is 195 Its total weight complete with the propeller hub is 511 lb , with the electric self-starter and generator it is 550 lb

The first trials of this engine, called the Aeromarine Type U-8 recently took place at Keyport, N. J., and exceeded all expectations. After having successfully passed a privately conducted twenty-hour test the new engine was taken down and found in such a satisfactory condition that it was at once reassembled and put on the block to pass the very stringent fifty-hour test prescribed by the United States Navy This test consists of eight five-hour runs and, at the conclusion of these, of a ten hour run. Between the runs the Navy allows one and a thirteen hour stops, respectively, the one-hour stops being for minor adjustments, while the thirteen-hour stops allow for general overhaul, during which carbon may be removed, valves ground and magnetos and spark plugs cleaned and adjusted.

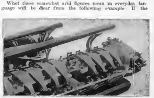
The Aeromarine U-8 engine tested, which was incidentally the first engine of this type to be built, ran through the entire fifty hour test without grinding of valves, cleaning of carbon, or any taking down beyond the removal of the valve casing for inspection, and no spark plug was changed during the entire test. That this engine should have taken no advantage of the overhaul privileges accorded by the Navy is a remarkable testimony as to its excellence, which is still further emphasized by the fact that the last twenty hours of the test were combined in a single run, a most unusual performance.

SIDE VIEW OF AEROMARINE U-8

At the conclusion of the fifty-hour test an inspection of the engine showed that its general condition was excellent, the extremely slight traces of carbon on the valves and the absence of oil on the spark plugs being particularly noteworthy The whole performance greatly impressed the Navy representatives who witnessed the test in official capacity

Although the Aeromarine U-8 engine is rated 180 hp during the Navy test it developed for half an hour 200 hp at its rated speed of 1750 r p m , an excess of eleven percent over its rated horsepower The unusually low gasoline consumption of this motor appears from the average of over 200 readings taken during the test, which works out at 0.472 lb per horsepower-hour for all conditions of the test, while the oil consumption was 0.011 lb per horsepower hour This is a performance which marks a considerable advance in the field of aero engine construction

What these somewhat arid figures mean in everyday language will be clear from the following example If the



VALVE GEAR ON NEW AEROMARINE ENGINE

Aeromarine 180 hp. engine were to consume the same amount of gasoline and oil as the famous German Mercedes of the same horsepower, the aircraft to which it was fitted would have to carry approximately 170 lb. more fuel for six-hour trip. And since the Mercedes weighs 160 lb. more than the Aeromarine U-8, the combined saving in dead weight and expense load effected by the new Aeromarine engine would enable a mail airplane to increase its earning capacity by some 14,000 letters.

"Municipal Landing Fields and Airports"

"Municipal Landing Fields and Airports," is edited and compiled by George Seary Wheat with chapters by the Chief of the Army Air Service, the Director of Naval Aviation, and other well known men. It is a very comprehensive statement of the urgent need of airplane landing fields in this country, and contains most useful information on their selection, construction and upkeep.

The fact that the development of aerial transportation depends almost entirely upon the existence of proper landing fields with equipment is well brought out. It presents convincing evidence that the commercial airplane can compete successfully with railroads, steamships and trucks, if proper terminals are built. The railroad must have rails, ties and equipment; the automobile a good road, while the only thing the airplane needs is a good landing field. There will be no depreciation of road beds as in the case of the railroads and the truck. The speed of transit, however, is greatly increased.

It sets forth the fact that the Government and airplane manufacturers are willing to help in establishing fields, but the cities and towns must first start the ball rolling. This is undoubtedly true, and the sooner the cities become awake to the importance of airplane service, the sooner will air transportation be entirely practicable.

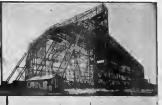
Chapter three outlines the construction of a field and how it should be located. It takes up the size of fields, their shape, and so forth. Landing places such as specified in this book should not be hard to find, and they would take care of any possible difficulties into which a plane might run. Not only does the book deal with landing fields, but it takes up the necessity of airports, their proper location, equipment and personnel.

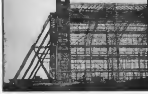
The book is a wonderful argument for commercial and pleasure flying. It refutes arguments that can be brought up against the future of the airplane. The men who have contributed to this book understand thoroughly the present needs of the airplane, and have done a good piece of missionary work for flying in this country.

The volume which is illustrated and contains 96 pages, is published by G. P. Putnam's Sons, New York.

The Lakehurst Hangar Is Nearing Completion


View looking north west showing 18 arches erected and the 19th and 20th pedestals erected


View looking east showing south west elevator tower and parapet at rear of building


View showing south west elevator tower and west door. This view shows height of tower compared with automobile in foreground.


View showing the large moveable travellers for erection of arches and roof travellers for filling in bracing between the arches.

(C) Underwood and Underwood

Airplanes and Forest Fires

By Paul G. Redington

The success of forestry in the Western United States hinges largely upon the protection of the timber resources from fire. The National Forests in California alone have over one thousand fires per year during the months of July, August and September. The essence of effective fire protection is prompt detection and quickness of dispatch and attack in suppression. The present lookout system, developed during the past twelve years within the National Forests, suffices to cope with the situation under normal conditions. The airplane does not in any sense supplant this principal method of detection, but merely supplements and augments its operation.

Limitations of Lookout Stations

The primary lookouts, located as they are on commanding eminences within the forest areas, have a general view of their field for twenty four hours of the day. They have, however, inherent difficulties to meet, such as the topographic nature of the area, permitting only a limited direct visibility, and secondly, temporary adverse atmospheric conditions, which sometimes preclude the possibility of any detection. Under such conditions it is that the airplane can serve its function as a valuable supplemental agency.

The usual primary lookout, serving an area of 200,000 acres, may have a direct view of only a small portion of this total, in which he can detect a fire from its very inception. He may be able to detect, on other portions of the area, fires when they have reached a moderate size of one to five acres. There are, however, still other portions, particularly in the deep canyons, from which smoke can only be seen when it comes from a fire having reached a point of extreme potential danger.

Special Advantages of Airplanes

The airplane flying at an average altitude of ten to eleven thousand feet through the California forests has before it like an open book, canyon and hillside, dense timber and open meadow. No matter how small the fire, a keen observer can note its full character without difficulty. This year a few fires were reported by the airplane which proved to be nothing but extra large camp fires. It was essential to train the observers to recognize the character of the smoke of a small uncontrolled fire.

It frequently happens that a haze covers portions of the National Forests during certain hours of the day when lookouts at the elevations can give no effective detection. The airplane observer, on the other hand, flying at higher altitudes can see through the moderate haze with sufficient accuracy to serve the purposes of quick detection. This is due entirely to the difference of the angles of incidence of the sunlight from the point of view of the airplane observer and the lookout. The same holds true for certain conditions produced by the smoke mantle from a large fire.

In these ways the airplane serves as a supplemental detection agency, where primary lookouts are unable to function fully. It must be pointed out, however, that during the pre-fire season when only a limited number of lookouts have been placed the suppression agencies largely depend upon the airplane for detection.

As pointed out, stationary lookouts give twenty-four hours' service. At best airplanes serve for a short specific period during the course of their flight. It is for this reason that with the high hazards existing in California, dependence on airplanes for detection, merely based on two daily trips over any given point, would not meet the needs.

Reconnoitering by Airplane

The airplane this year had ample opportunity to demonstrate its use in connection with definite missions in fire detection and fire suppression. After a severe lightning storm which covered parts of Northern California, special trips were made over the lightning zones. Lightning fires have proved a source of great trouble. A tree having been struck may smoulder for a good many days before a definite column of smoke of sufficient size to be picked up by our lookouts will be emitted. The airplane has readily detected such fires.

The chief special use of the airplane this year was made in connection with some large fires burning in the northern part of California.

The Mill Creek fire in the Lassen National Forest was located in an extremely inaccessible territory and covered a very rugged, broken country, which made it almost impossible for the ranger in charge to keep in touch with all sides of the fire. It would have been out of the question for him to have covered the perimeter of the fire in less than a three days' hard journey. A radio station was set up at the main fire camp and an airplane reconnoitered the entire fire-line twice daily and kept the ranger fully informed by radio of the situation. The patrol work of the airplane after the fire was under control saved a good many hundred dollars daily in the wages of fire-fighters as patrolmen, for whom supervision would have been difficult at best. The airplane was used extensively in transporting fire-crew leaders from various forests to points of dire need, saving days of otherwise lost travel time.

Transportation of Trained Forces

The Lassen National Forest had 32 lightning fires start in one ranger district within a two-day period, which taxed the capacity of the regular force. Large crews of fire-fighters were on hand but there was a decided lack in trained forest officers to handle the crews. Immediate action was required. Fortunately, the Stanislaus National Forest was then enjoying a period of quiet, when the "SOS" was received from the Lassen; a plane was dispatched to the Stanislaus and brought back two forest officers who reached one of the large fires that same night. This saved three or four valuable days. Two days later a break occured on the Stanislaus, and it called for the return of its men. Again the plane was put into action, and the men were back on their forests the same night.

This feature is exceedingly important, making it possible to mobilize and transport our trained forces all over the state. This mobility of trained men was almost entirely lacking heretofore.

Detection Work

In detection the airplane has proved its place. With good trained observers a large percentage of fires can be located within a quarter of a mile. An observer flying over the Shasta National Forest radiographs to the forest supervisor, "A small fire, just started in heavy timber, burning slowly, wind N. W." When the plane lands at the base the observer calls up the forest supervisor to confirm the message. The local forest officer questions whether this is a forest fire, as he had been notified by a cowman that he would burn a carcass in that general vicinity the same day. The observer is firm in his statement. When the ranger reaches the place, true enough, a small timber fire is slowly eating its way northwesterly up a gentle mountain slope.

Reliability of the Service

By use of radio immediate communication is available to the suppression forces. For the special jobs enumerated no other medium can take its place both as to accuracy and dispatch. Taken in conjunction with the training of an adequate Army air personnel, airplane air patrol has a very definite, distinct and valuable use. Twenty millions of acres of National Forest land are viewed practically every day by the observers, besides an enormous area outside, along the patrol routes. Brush and grass fires outside the forests were reported to the state forest authorities, and in this connection the writer desires to record the appreciation of the Forest Service of the splendid spirit of cooperation which was at all times evident with the Air Service, the Signal Service, the state forester and many public bodies who through direct appropriation of money made possible the preparation of adequate landing fields and the construction thereon of improvements for the housing of the men.

For the number of hours flown—better than 3,000—and for the mileage, which ran up into the hundreds of thousands, the number of casualties was remarkably low. But the air patrol is a safe undertaking, and given good care the great ships are steady, fast and reliable. It is to be very greatly hoped that we shall have a continuation of the Airplane Forest Patrol next year and the larger use of wireless telegraphy and telephony.—*Journal of Electricity.*

Monthly Reports of Air Mail Service

August, 1920

Division	Gas	Grease and Oil	Office Force and Watchmen	Motor Cycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Misc.	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	Total
New York—Washington	$2,620 34	$381 66	$1,284 39	$771.65	$378 46	$617 52	$779 10	$8,470 66	$2 398 72	$947 81	$882 18	$14,181.31
St. Louis—Twin Cities*	1,081.20	268.07	668 78	395 05	64.18	772 38	1,872 68	0,348 90	1 618 14	482 24	661 81	6,898 20
New York—Chicago	6 409 18	1 120.49	2,011 74	1 680 17	548 84	1,331 89	4 888 85	4,700.88	4,487.55	8,180 62	8 089 81	32,844 18
Chicago—Omaha	0,913 84	461.37	682 84	672 01	128.18	262 10	9 502 40	2,638 24	2,314 78	466.30	1,036.23	14,140 88
Omaha—San Francisco† (Trial flights)	916 83	164 03	478 78	72.30	—	160 50	610 10	478 93	164 10	106.35	268 86	3,892 68
Totals and Averages	$10 687 60	$2 866 10	$5,648 40	$3 406 06	$1,081 66	$8 164 68	$10 520 01	$13 641 02	$10,281 81	$8,237.02	$4 177 08	$70,028 83

Service and Unit Cost

Division	Gal of gas	Total time run hr	min	Total miles run	Miles run per gal of gas	Cost per hour	Cost per mile
New York—Washington	8,069	647	10	27 568	3 4	$40 87	$ 81
St. Louis—Twin Cities*	2,688	177	37	12 665	4.4	50.24	70
New York—Chicago	18,284	618	40	44,780	2 3	58 78	78
Chicago—Omaha	8,320	868	55	28,370	3.2	48 48	84
Omaha—San Francisco† Trial Flights	1,878	88	40	4,628	3 4	51 88	84
Totals and Averages	39 812	1 477	50	116 028	2 8	$48 41	$.83

Notes * Service inaugurated August 16 1920
† —Service not inaugurated—trial flights.

Cost Per Mile

Division	*Overhead*	*Flying*	*Maintenance*
New York Washington	$ 14	$ 14	$ 22
St. Louis-Twin Cities	14	25	23
New York-Chicago	22	28	20
Omaha SanFrancisco (Trial Flights)	10	.27	18
Chicago-Omaha	18	23	18
Entire Service	$ 17	$.23	$.23

Planes Operated

New York Washington Division

Curtiss JN-4H equipped with Hispano-Suiza 8 motors;
Curtiss R-4 equipped with Liberty 12 motor
Curtiss H A equipped with Liberty 12 motor
Curtiss JN-4D, equipped with Curtiss OX 5 motors,
De Havilands equipped with Liberty 12 motors;
Dual De Havilands, equipped with Liberty 12 motors,

St Louis Twin Cities Division

Curtiss JN-4H, equipped with Hispano-Suiza 8 motors
Twin De Havilands, equipped with two Liberty 6 motors,
Dual De Havilands equipped with Liberty 12 motor,

New York-Chicago Division

Curtiss JN-4H, equipped with Hispano-Suiza 8 motors,
Curtiss R-4, equipped with Liberty 12 motors
Curtiss H A equipped with Liberty 12 motor,
De Havilands equipped with Liberty 12 motors,
Dual De Havilands, equipped with Liberty 12 motors
Twin De Havilands, equipped with two Liberty 6 motors,
Martins, equipped with two Liberty 12 motors
Junkers (Larsen, J L.), equipped with B M. W motors,

Chicago-Omaha Division

Standard equipped with Hispano-Suiza motor,
De Havilands equipped with Liberty 12 motors,
Dual De Havilands, equipped with Liberty 12 motor;

Omaha-San Francisco Trial Flights

De Havilands, equipped with Liberty 12 motors.

September, 1920

Division	Gas	Grease and Oil	Office Force and Watchmen	Motor cycles, Trucks	Rent, Light, Fuel Power Telephone and Water	Misc	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	Total
New York—Washington	$6,284 17	$328 88	$908 92	$818 84	$858 09	$7 10.16	$1 476.52	$3,160 07	$2 405 52	$828.89	$811 10	$18,861 92
St Louis—Twin Cities	1 677 83	826.59	885 78	720.88	68 88	784 61	1 878 64	2,280 41	618 81	390 18	398 84	8,478.36
New York—Cleveland	3,517 68	332 81	1,186.77	776.40	663.21	1,808 00	2,838 48	3,170.41	8,898 46	2,147 88	881 68	18,661 76
Cleveland—Chicago	3,688 78	724.48	864 64	814.48	817 80	1,4 88 68	1,017 06	3 084 21	2,468 82	1788 92	481 88	17,257 99
Chicago—Omaha	2,868 53	397.11	844 92	927 88	72 70	888 87	8,128 03	3,025 66	8,127.58	460 66	461.06	16,528 74
Omaha‡—Salt Lake	8,871 68	588.81	1,300 14	589 64	82.61	3,224.38	3,111 14	1,878 32	1 010 81	887.48	1,687 68	15,340 97
Salt Lake‡—San Francisco	1,505 64	390.68	1,309 78	458.78	77.28	6,268 88	1,391 87	8,105 22	813 16	148 68	868 80	16,897 12
Totals and Averages	$19 805 41	$2,086 66	$7 168 20	$4,418.58	$1,627 10	$18.5 88 60	$16,524 08	$18,801 68	$17,009.87	$5,816 08	$4,270.51	$188,751 78

‡Service inaugurated, September 8, 1920

Service and Unit Cost

Division	Gal of gas	Total time run hr	min	Total miles run	Miles run per gal of gas	Cost per hour	Cost per mile
New York—Washington	8 062	283	34	17,492	2 0	$69 05	$ 79
St. Louis—Twin Cities	2,880	173	34	12,001	4 0	54.60	79
New York—Cleveland	10,486	284	24	28,477	2 1	67,26	88
Cleveland—Chicago	11 748	293	26	24 308	2.1	67 60	78
Chicago—Omaha	7,716	257	10	25,588	3 3	67.54	.65
Omaha—Salt Lake‡	10,883	232	22	20,557	1.9	66 00	73
Salt Lake—San Francisco‡	8 888	138	20	9 282	2 4	117 66	1 71
Totals and Averages	68,877	1,626	40	132,202	2 8	$66 79	$ 82

‡ Service inaugurated September 8, 1920

Cost Per Mile

Division	*Overhead*	*Flying*	*Maintenance*
New York Washington	$ 18	$ 23	$ 37
St. Louis-Twin Cities	21	27	.31
New York Cleveland	23	28	37
Cleveland Chicago	18	26	28
Chicago-Omaha	10	20	35
Omaha Salt Lake	15	39	.28
Salt Lake-San Francisco	30	36	1 05
Entire Service	$ 18	$ 28	$.36

Planes Operated

New York-Washington Division

Curtiss R-4's, equipped with Liberty 12 motors,
Curtiss JN-4D's, equipped with Curtiss OX 5 motors,
De Havilands, equipped with Liberty 12 motors
Dual De Havilands, equipped with Liberty 12 motors.

St Louis-Twin Cities Division

Curtiss JN-4H equipped with Hispano-Suiza 8 motors;
Twin De Haviland, equipped with two Liberty 6 motors

New York-Cleveland Division

Curtiss R-4's, equipped with Liberty 12 motors,
Curtiss H A, equipped with Liberty 12 motor
De Havilands equipped with Liberty 12 motors
Dual De Havilands equipped with Liberty 12 motors;
Twin De Havilands, equipped with 2 Liberty 6 motors
Martin equipped with two Liberty 12 motors
Junkers (Larsen, J L) equipped with B M W motors

Cleveland-Chicago Division

Curtiss R-4's, equipped with Liberty 12 motors
De Havilands, equipped with Liberty 12 motors
Dual De Haviland equipped with Liberty 12 motor,
Twin De Havilands, equipped with 2 Liberty 6 motors,
Martins, equipped with 2 Liberty 12 motors
Junkers (Larsen, J L), equipped with B M W motors

Chicago-Omaha Division

De Havilands, equipped with Liberty 12 motors
Junkers (Larsen J L.) equipped with B M W motors

Omaha-Salt Lake Division

De Havilands, equipped with Liberty 12 motors

Salt Lake-San Francisco Division

De Havilands equipped with Liberty 12 motors

A German Sport Monoplane

The Sablatnig Flugzeugbau Gie has designed a machine of quite small dimensions and low power, which, when towed by a small motor car, can be conveyed through the streets, without interfering with traffic It is designed to be folded down as well as prepared for flight within a few minutes.

Two Views of the Sablatnig KE-1 Ready for Flight and for Transport

The speed reached by this small machine of 8.4 m span is 110 km. per hr The planes are braced by means of cables to the fuselage and a small cabane in front of the pilot The very substantial fuselage is made up of wooden frames covered with three-ply wood A 3-cylinder 20 hp. engine drives a tractor propeller The stabilizer and elevator are braced to the fin by a single wooden stay Fuel can be carried for two and five-tenths hours

To fold the airplane for transport on the ground the stay of the stabilizer is loosened and the stabilizer and elevator hinged upwards Turning round the handle visible at the top of the cabane will release the cables of the supporting planes, thus allowing the latter to be readily withdrawn. Special rests are provided on the chassis and at the end of the fuselage to support the supporting planes during transport, so that the gage of the chassis is not exceeded Thus folded down, the airplane is carried as a trailer by a small motor car, the tail skid being inserted into a clip at the rear of the latter.

In order to get the airplane ready for flight, the same operations are repeated in an inverse order. No special tightening is required before starting, the tightening wires being stretched uniformly by the lock.

When folded down, the airplane can be stored in an ordinary automobile garage, no special airplane shed being required, which greatly reduces the operating expenses.

Specifications of Sablatnig KE-1

Engine	3-cylinder 20 h p., air-cooled, constructed by Rheinische Aero-Werke
Weight empty	188 kgs
Load	100 kgs
Fuel	For 2 5 hr
Span	8.40 m
Length	6.20 m
Height	2 20 m
Width during transport	1 40 m.
Speed	110 km per hr
Persons carried	1 pilot.

Pursuit School at Ream Field

Maj. S. W. Fitzgerald, commanding officer of Rockwell field, announced November 23 that plans were being made for establishing at Ream field, several miles away, a pursuit school for army aviators. Advanced work of various kinds, including target practice, will be taught there to men from March and Carlstrom fields if the plan is carried out.

No Speed Records Claimed

The Contest Committee of the Aero Club of America is not claiming any world's records for the contestants in the Pulitzer Trophy Race on Thanksgiving Day. This is due to a slight misunderstanding concerning the length of the course. The committee laid out the course and accurately measured its

General Menoher, General Pershing, Secretary Daniels and Officials of the Aero Club Watching the Pulitzer Trophy Race
International

length long before the race. The turning points were to be marked by kite balloons. Shortly before the race, the committee was informed that the balloons could not be furnished. They then selected windmills near the points previously chosen and wrapped them with white cloth to make them suitable for pylons. The length of the course, as flown, will be accurately determined by the U. S. Coast and Geodetic Survey at the request of Gen. Mitchell.

Armistice Day Race

The winner in a field of five, Victor Vernon, piloted the Curtiss Oriole of the Oregon-Washington & Idaho Airplane Company over the 15 mile course from the Lewis & Clark aviation field, touching at the municipal field and flying back in 16 minutes 20 seconds in the handicap race at the aviation field meet in Portland, Ore., November 11.

Victor Vernon also took first place in the spot landing event, bringing his plane to a stop in an average distance of 62 feet of the white circle in three trials. Lieut. Verne Ayres won first from a field of three in the stunt flying event. He piloted the Dudley airplane.

A cold east wind sweeping across the field like a hurricane made flying difficult. L. E. Butler, who was scheduled to make a parachute drop from a Curtiss JN-4, piloted by Lieut. Archie Roth, was forced to abandon the attempt when his parachute blew from the wing of the machine after it rose from the ground.

Second honors in the handicap race were taken by Joe Peters in his own machine, the Arvo. His time was 17 minutes 13 seconds, but his handicap of 6 seconds left him but 1 minute 7 seconds behind Captain Vernon. Lieutenant Roth was third, time 25 minutes 7 seconds, and Capt. Frank Harding in Curtiss JN-4 No. 60, fourth, time 26 minutes 45 seconds. Both these planes were entered by the Oregon-Washington & Idaho Airplane Company and carried a handicap of 2 minutes 37 seconds over the Oriole. Lieut. Jack Clemence failed to finish with the Curtiss Standard, the entry of Mrs. George Dye.

In the spot landing contest, Captain Harding took second place with an average of 102 feet in the three trials. He established the record for accurate landing, however, in one trial, when he brought his machine within 15 feet of the mark. Lieutenant Roth was third with 104 feet.

English Air Mail Changes

The British postmaster general has announced that beginning Monday, November 1, the Brussels air mail will leave Cricklewood Aerodrome at 12.30 p. m. instead of 1.30 p. m., and the mail service to Amsterdam will cease for the winter. The latest times of posting in London for the Brussels Air Mail are as follows:

(a) Unregistered letters handed over the counter at certain post-offices: General Post Office, 11.30 a. m.; Threadneedle street branch office, 11.15 a. m.; Lombard street branch office, 11.15 a. m.; Parliament street branch office, 11.20 a. m.; Charing cross branch office, 11.20 a. m.; Western Central district office, 11.40 a. m.; Western district office, 11.15 a. m.; South Western district office, 11.15 a. m.; South Eastern district office, 9.00 a. m. Registered letters must be handed in five minutes earlier in each case.

(b) Letters posted in public letter-boxes: The latest times of posting in each district will be somewhat earlier than those given above. Precise information may be obtained at the district office. In the provinces information as to the latest time of posting should be sought from the Postmaster.

Letters for Brussels sent by air mail will in normal course be delivered late the same afternoon, and those for Antwerp, if prepaid for express delivery the same evening. Letters for other places in Belgium will normally be delivered by first post next morning. Earlier delivery by from six to twenty-four hours can be obtained for letters for South Germany (Frankfort, etc.) Austria, and Hungary, posted in London on the day of despatch or in the provinces on the previous day too late for the night mail to London. Letters for North Germany, Denmark, Sweden and Norway will no longer be benefited.

Panama Flight Plans

The west coast is showing a great deal of interest in the proposed flight of the Pacific Fleet air boat force which starts from San Diego for the Panama Canal three days after Christmas. The flight to the Canal and return will cover approximately 6548 miles and the naval aviators in charge of the flight hope to make it in record time.

New Years will be spent at Banderas Bay on the western coast of Mexico in the state of Jalisco, 1250 miles from their starting point. From there no rest will be taken until Panama is reached. The air boat force is ambitious to break all records by arriving at the Panama Canal January 12, and thus equaling the splendid record made by their brother aviators of the Atlantic Fleet during the southern cruise of the Fleet last winter. The itinerary of the air boats is as follows:

Dec. 28, San Diego to Cerros Island; Dec. 29, Cerros Island to Magdalena Bay; Dec. 30, Magdalena Bay to Banderas Bay; Jan. 4, Banderas Bay to Acapulco; Jan. 5, Acapulco to Chipequa; Jan. 6, Chipequa to Jaquilisco Bay or Gulf of Fonseca; Jan. 10, Jaquilisco Bay or Gulf of Fonseca to Gulf of Nicoya; Jan. 11, Gulf of Nicoya to Montijo Bay; Jan. 12, Montijo to Balboa, Panama.

Dudrey Aircraft Co. Increases Equipment

Plans are being outlined for the erection of a new building on Broomfield flying field, Portland, Ore., for the housing of the aeronautical school of the Dudrey Aircraft Co.

As the result of the heavy enrollment of students in the school this fall the present building is rapidly being outgrown, it is declared, and greater facilities for the handling of the classes are beginning to be a necessity.

The building which it is proposed to erect this winter will cost about $25,000 and will have ample shop and classroom space for the handling of the technical and lecture work of the school.

With All Their Decorations
General Mitchell, Colonel Hartney and Captain Wright with their Young Sons
(C) *Underwood & Underwood*

S. A. E. Organizes Washington Section

At a meeting held in the Cosmos Club, Washington, D. C., November 20, local members of the Society of Automotive Engineers organized a Washington Section. The meeting was opened by C. H. Young who introduced Coker F. Clarkson, secretary and general manager of the society. Mr. Clarkson sketched briefly the origin of the society and its development to its present position.

Capt. St Clair Street, Air Service, followed with a very interesting talk on his flight to Alaska and return. Capt. Street drew some remarkable comparisons between the time made from point to point on his trip and the traveling time by present means of transportation in parts of the territory. His enthusiastic comments on the performance of the Liberty motors with which the planes were equipped were of particular interest in view of the part taken by members of the society in the development of this engine.

After the talks, the Washington Section was formally launched and Dr. H. C. Dickinson of the Bureau of Standards was unanimously elected as chairman, Col. F. H. Pope was elected vice-chairman, Archibald Black, secretary and Conrad H. Young, treasurer. An informal session followed, when the chair threw the floor open to all present, for the discussion of the proposed section activities.

New Company Active in St. Louis

The Robertson Aircraft Corp. is doing a general aviation business in St. Louis, and is getting a 183 acre field into fine shape. They are at present receiving bids for two three-ship hangars and a warehouse, are planning to conduct a school beginning some time in the spring and to maintain a service station for passing fliers. Hopes are entertained of obtaining distribution rights from some of the manufacturers. At present they are doing advertising, passenger carrying, exhibition flying and selling engines, planes and spare parts.

Navy Testing Miniature Kite Balloons

The Navy is testing miniature kite balloons at the U. S. Naval Air Station, Pensacola, Fla. These balloons have a capacity of 6000 cu. ft. and are intended for aerological research work. They have expanding gores on their sides, to take care of the expansion due to altitude, instead of automatic valves. These miniature balloons will be flown from electric winches. Their purpose is to obtain records of wind, humidity and temperature aloft. They are designed to have sufficient free lift to carry the necessary aerological instruments and a light cable to about 5000 ft. If successful under tests, these balloons will be flown astern of vessels at sea, and used when the ordinary methods of obtaining aerological information fail.

Flying Activities at Spokane

Winter flying at Spokane is to be dveloped this season. Two schools will be in operation and the list of pupils is already long. December will see activities approaching their peak.

During 1920 the Foster-Russell Aviation Co. placed thirteen planes in the Spokane country, and prospects for increased sales in 1921 are excellent.

In anticipation of its school work the Russell company has added Walter E. Lees to its corps of instructor-pilots. He has no less than 5,500 hours of flying to his credit. He started flying in 1913 and in the following year entered the employ of the Curtiss company. During the war he was employed as an instructor, and later as test pilot. Mr. Lees is most favorably impressed with Spokane as an aviation center because of the exceptional number of flying days and the resources of the section in respect to landing fields.

New Club in Des Moines

Organization of a new aero club has been launched in Des Moines. It is to be called the Des Moines Aero Club and will be open to popular membership. An inducement held out to those interested in flying is the week-end aerial trip to Chicago, which the club will offer two of its members each week. A passenger carrying plane has been purchased to make the weekly journey.

School of Aviation in Valparaiso

A sum of $565,000 has been raised by a committee, aided by a government grant, for the purpose of founding a civil school of aviation in Valparaiso, South America. The aerodrome is to be complete with hangars and workshops. Suitable ground to the extent of 1,250,000 sq. meters has been secured, and part of it will be laid out for football matches and other outdoor sports.

End of Annual Maneuvers, Luke Field, H. I.

The period of annual maneuvers ended the night of November 3, completing ten days of simulated warfare in which the Second Observation Group participated to the extent of over 150 hours of airplane flying time, irrespective of the time flown on engineering and radio test flights and practice flights. This time was divided among the following missions, special patrols 28, general patrols 32, artillery reglage 13, inter-island reconnaissance 4, special (visual) reconnaissance 5, photographic reconnaissance 18, bombing (in formations) 2, attacks 8, night reconnaissance 4.

The last three days of hostilities were practically a duplicate of the activities of the first three days, in which all available front line troops were concentrated at improved positions on the north shore of Oahu. Photographic and visual reconnaissance flights were made over the sector and contact maintained by our planes with all ground movements. Attack and bombing formations were flown on the concluding day when the White Forces (enemy) were reported landing troops from transports off Waialnia Bay. Patrols operated in all sectors until the evening of the 29th. Two night reconnaissance flights were flown on the 27th and 28th.

The Coast Artillery was also active during the week. Regulation of fire with the Battery at Ahua Point, Fort Kamehameha, was conducted on the 27th. As the target was at sea an HS2-L boat was used as the observing plane. On the following day Battery Harlow, Fort Ruger, fired on a land target. A DeH-4 plane equipped with a two way radio set was used successfully in spotting and regulating the shots.

During the ten days of maneuvers the Second Observation Group worked with the one object of establishing a good record. With the limited personnel it was necessary for everyone to extend his efforts to the limit. This was done with an enthusiasm that exceeded all expectations, and a high standard of efficiency was maintained throughout all departments of the field.

A critique was held at Schofield Barracks by the Commanding General of the Department. A summary of all situations and movements, which were developed in the maneuvers, was made and criticisms and commendations were expressed. Some excellent points were disclosed relative to the geography of Oahu, its natural defenses, possibilities for defense and accommodations for troops. The general expression of opinion was one of satisfaction with the work of all organizations.

Strength of Army Air Service

The Army Air Service is now operating on less than one-half of its authorized enlisted strength. Major Gen. Charles T. Menoher, Chief of Air Service, has informed commanding officers of all Air Service activities that under the decentralization of recruiting activities to corps areas there should be the fullest cooperation with local representatives of the General Recruiting Service. General Menoher states:

"The Air Service, with all the advantages it has to offer, if fully and aggressively presented, can, in a short time, fill its ranks with desirable enlisted personnel. It should be borne in mind that more is desired than to bring the Air Service up to its authorized strength at the present time. A permanent Air Service recruiting organization must be developed and maintained in order that there may be a steady flow of good recruits and to replace losses by discharge."

For the present the allotted strength of the Air Service stations and organizations is on a basis of 11,000 men, and not on the basis of the authorized strength of 16,000 men.

Plan Dash by Airplane to Oil Field

Edmonton, Alb., is preparing for the first rush by airplane to the petroleum fields near Fort Norman, on the Mackenzie River, nine hundred miles toward the frozen north, heralded by Dominion surveyors as richer than the oil lands of California.

Negotiations already are under way for establishment of an aerial service out of Edmonton, with landing stages along the route provisioned with food and fuel for prospectors and machines.

British Columbia Airport Progresses

The first British Columbia Air Station, situated at Jericho Beach, just out of Vancouver city, is proving a convincing success, and is rapidly re-establishing the confidence of the westerner in the ability of aircraft to function in their allotted element without mishap to man or machine. Although authorized only in July of this year, the Air Station, under the direction of Major C. MacLaurin, D.S.O., D.F.C., is now firmly established with a staff of some twenty ex-R.A.F. men, with two permanent hangars, and is rapidly collecting the twelve machines alotted to it for service in the department of flying operations of the Canadian Air Board.

At present, the personnel includes the superintendent Major MacLaurin, Captain Templeton, pilot and another officer with a pilot's certificate, who comprise the fliers of the establishment. Some six riggers and six fitters under a foreman, with two clerks, complete the details, all employed under the Civil Service Commission with salaries which, although not munificent, are likely to be presently increased.

The first trip after purely test flights around Vancouver, was up the Fraser Valley, when Major MacLaurin in person piloted a Dominion Government entomologist to view the extent of the mosquito-breeding swamps of that valley. As a result of this entomological flight the department has been able to assist in mapping out a system of campaign for the extermination of the mosquito pest.

Aerial Legislation in Argentina

Although aviation is not so far advanced in Argentina as in Europe or the United States, legislation is already in hand designed to regulate flying in all its aspects and branches, outside, of course, the national military and naval services. The committee appointed by the Ministry of War has been dealing exhaustively with this subject. There is to be no flying of a spectacular or risky nature over populated areas, and aviators must be fully qualified and in possession of certificates to that effect, and their machines must likewise carry certificates of airworthiness.

Military or naval aircraft are to have access to any airport. Any service of machines may be conceded, if of public utility, on reasonable conditions. In a national emergency all aircraft may be commandeered without exception. Log books must always be carried, as well as a list of standing instructions and signals.

Customs houses, lights, prohibited areas, diplomas, etc., are all considered, and penalties in particular have not been forgotten.

The consideration of these aerial regulations has given confidence to existing and proposed aviation companies, who will soon have the satisfaction of knowing their legal and national standing.

Close Race in Montreal

So close was the finish of the airplane races at the opening of the new airport and hangar of the Aerial League of the new British Empire, at the Bois Franc road, St. Laurent, Montreal, that only 30 seconds divided the two winning contestants. Aviator Brian Davilla won on time, but disregarded the rules laid down for landing, while Adelard Raymond, who was beaten half a minute, followed the rules and was awarded first prize, a silver cup. Mr. Raymond, however, refused to accept the prize, claiming he had been beaten. After some discussion two trophies were awarded, one to the winner and one to the runner-up. Three Curtiss biplanes competed.

Naming of Aviation Fields in P. I.

The aviation field at Camp Stotzenberg, Pampango, P. I., has been named Clark Field in honor of Major Harold M. Clark, Air Service, who was killed in line of duty in an airplane accident in the Panama Canal Zone, May 21, 1919.

The aviation field of Fort Mills, Corregidor Island, P. I., has been named Kindley Field, in honor of Captain Kindley, Air Service who was killed in line of duty in an airplane accident at Kelly Field, San Antonio, Texas, February 1, 1920.